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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/778,744

02/08/2001

Ramesh H. Kakkad

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03/31/2003

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EXAMINER

COLEMAN, WILLIAM D

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 03/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/778,744

Applicant(s)

KAKKAD, RAMESH H.

Examiner

W. David Coleman

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicants amendment filed January 24, 2003 in paper no. 10 have been considered.

Applicant contends that the rejection of claims 1-21 under 35 U.S.C. § 102(e) over Arkles et al., U.S. Patent Publication No. US2002-0119327 A1 is respectfully traversed.

Applicants contend that Arkles fails to disclose the method for fabricating a film of claim 1, the method for fabricating a memory device of claim 21 by failing to supply electrical energy to a mixture of noble gas and reactant gas at a total pressure of 90kPa to 110 kPa.

In response to Applicants contention that Arkles fails to disclose Applicants total pressure in the units of kPa, please note that Arkles uses an equivalent pressure unit as disclosed in [0030]. One of ordinary skill in the art will realize that the SI units of Kilopascal can be converted to the unit of Torr, therefore Arkles meets Applicants claim limitations.

Applicant contends that Arkles fails to disclose the method of fabricating a memory device.

In response to Applicant's contention that Arkles fails to teach fabricating a memory device, Applicant is directed to [0001] where a memory device such as RAM is taught.

Applicant contends that Arkles fails to disclose a method for fabricating a film including supplying optical energy with a light of wavelength less than 200 nanometers to a mixture of noble gas and reactant gas to create reactive species.

In response to Applicant's contention, that Arkles fails to teach supplying optical energy, Applicants are directed to Example 3 [0056] where supplying optical energy is taught.

Applicant contend that Arkles supplies electrical bias to the substrate and not the gas mixture to form a film.

In response to Applicant's contention that Arkles only supplies an electrical bias to the substrate and not the gas mixture to form a film, one of ordinary skill in the art would know that applying a bias to the substrate will cause the substrate to sputter. It would be difficult at best to form a film on the substrate if only the substrate was electrically biased. Furthermore, it is well known in the art to supply a bias to the substrate so as to increase the possibility of forming a film on the substrate. Please note that Applicant's claims do not preclude applying a bias on the substrate.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

- (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
- (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claims 1-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Arkles et al., U.S. Patent Publication No. US 2002/0119327 A1.

3. Arkles discloses a semiconductor process as claimed.

Pertaining to claim 1, Arkles teaches a method for fabricating a film, the method comprising:

supplying electrical energy [paragraph 0038] to a gas mixture of noble gas [0026] and reactant gas at a total pressure of 90 kPa to 110 kPa [0050] to create reactive species, the reactive species [0026] forming a film on a substrate [Abstract] the electrical energy being used for producing noble gas radicals and ions, the noble gas radicals and ions colliding with the reactant gas to form the reactive species.

4. Pertaining to claim 2, Arkles teaches the method of claim 1, said energy being supplied to the gas mixture by electric power in a frequency range of 1 kHz to 100 MHz [0038].
5. Pertaining to claim 3, Arkles teaches the method of claim 1, one of helium, argon, neon krypton, xenon or one of a mixture of at least two chosen from a group consisting of helium, argon neon, krypton and xenon being used as noble gas [0026].
6. Pertaining to claim 4, Arkles teaches the method of claim 1, temperature of the substrate on which said film is to be formed being in a range of 25 to 500⁰C [0018].
7. Pertaining to claim 5, Arkles teaches the method of claim 1, the film being silicon, oxide or having a composition close to silicon dioxide [0018].
8. Pertaining to claim 6 Arkles teaches the method of claim 1, the film being silicon nitride or having a composition close to silicon nitride [0018].
9. Pertaining to claim 7, Arkles teaches the method of claim 1, the film being one of a silicon film, a doped silicon film, and a hydrogenated-silicon film [0011].
10. Pertaining to claim 8, Arkles teaches the method of claim 1, the film being one of a metal and an alloy film [0013 (silicon alloys with aluminum which is a metal)].
11. Pertaining to claim 9, Arkles teaches a semiconductor device comprising a film fabricated according to the method of claim 1 [0001].

12. Pertaining to claim 10, Arkles teaches the semiconductor device of claim 9, the semiconductor device being one of a metal oxide semiconductor field effect transistor device, a thin film transistor, and a silicon on insulator device [0001].
13. Pertaining to claim 11, Arkles teaches the semiconductor device of claim 9, the semiconductor device being a photovoltaic device (i.e., solar applications) [0001].
14. Pertaining to claim 12, Arkles teaches an electro-optical apparatus comprising the semiconductor device of claim 9 [0058 (i.e., flat panel display)].
15. Pertaining to claim 13, Arkles teaches a memory device comprising a film fabricated according to the method of claim 1 [0001].
16. Pertaining to claim 14, Arkles teaches the memory device of claim 13, the memory device being one of a metal oxide semiconductor field effect transistor device, a thin film transistor, and a silicon on insulator device [0001].
17. Pertaining to claim 15, Arkles teaches the memory device of claim 13, the memory device being a photovoltaic device [0001].
18. Pertaining to claim 16, Arkles teaches a method for fabricating a film, the method comprising:
 - supplying electrical energy to a gas mixture of noble gas and reactant
 - gas at a total pressure of 1 kPa to 110 kPa to create reactive species, the reactive
 - species forming a film on a substrate, the electrical energy being used for producing
 - noble gas radicals and ions, the noble gas radicals and ions colliding with the reactant gas to
 - form the reactive species.

19. Pertaining to claim 17, Arkles teaches a method for fabricating a film, the method comprising:

supplying optical energy with a light of wavelength less than 200 nanometer to a mixture of noble gas and reactant gas to create reactive species, the reactive species forming a film on a substrate [0044], the electrical energy being used for producing noble gas radicals and ions, the noble gas radicals and ions colliding with the reactant gas to form the reactive species.

20. Pertaining to claim 18, Arkles teaches a semiconductor device comprising a film fabricated according to the method of claim 17.

21. Pertaining to claim 19, Arkles teaches a memory device comprising a film fabricated according to the method of claim 17.

22. Pertaining to claim 20, Arkles teaches a method for fabricating a semiconductor device, the method comprising:

a step of forming a film by supplying electrical energy to a mixture of noble gas and reactant gas at a total pressure of 90 kPa to 110 kPa to create reactive species, the reactive species forming a film on a substrate, the electrical energy being used for producing noble gas radicals and ions, the noble gas radicals and ions colliding with the reactant gas to form the reactive species.

23. Pertaining to claim 21, Arkles teaches a method for fabricating a memory device, the method comprising:

a step of forming a film by supplying electrical energy to a mixture of noble gas and reactant gas at a total pressure of 90 kPa to 110 kPa to create reactive

species, the reactive species forming a film on a substrate, the electrical energy being used for producing noble gas radicals and ions, the noble gas radicals and ions colliding with the reactant gas to form the reactive species.

Claim Rejections - 35 USC § 112

24. Claim 22 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The disclosure does not provide support for limitations of the electrodes or the distance between the electrodes.

Correction is required.

Claim Rejections - 35 USC § 103

25. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

26. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arkles et al., U.S. Patent Application Publication No. US 2002/0119237 A1.

27. Arkles discloses a semiconductor process substantially as claimed. However, Arkles fails to teach a method for fabricating a film according to claim 2, the electric power being applied through electrodes, the distance between the electrodes being less than 5mm. Given the teaching of the references, it would have been obvious to determine the optimum thickness, temperature as well as condition of delivery of the layers involved. See *In re Aller, Lacey and Hall* (10

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USPQ 233-237) "It is not inventive to discover optimum or workable ranges by routine experimentation. Note that the specification contains no disclosure of either the critical nature of the claimed ranges or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Any differences in the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986)

Appellants have the burden of explaining the data in any declaration they proffer as evidence of non-obviousness. *Ex parte Ishizaka*, 24 USPQ2d 1621, 1624 (Bd. Pat. App. & Inter. 1992).

An Affidavit or declaration under 37 CFR 1.132 must compare the claimed subject matter with the closest prior art to be effective to rebut a prima facie case of obviousness. *In re Burckel*, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979).

Conclusion

28. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

29. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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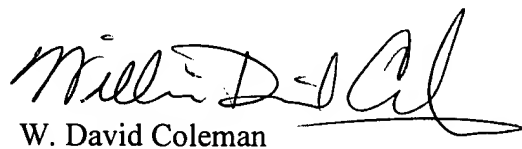
however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 703-305-0004.

The examiner can normally be reached on 9:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7721 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

A handwritten signature in black ink, appearing to read 'W. David Coleman', with a long horizontal flourish extending to the right.

W. David Coleman
Examiner
Art Unit 2823

WDC
March 28, 2003